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Reviewed work(s):
Source: *American Anthropologist*, New Series, Vol. 76, No. 4 (Oct., 1974), pp. 818-823
Published by: Blackwell Publishing on behalf of the American Anthropological Association
Stable URL: http://www.jstor.org/stable/674307
Accessed: 04/06/2012 16:48

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Voodoo Death:
New Thoughts on an Old Explanation[1]

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Extant physiological explanations of "voodoo death" are augmented with information about neurophysiological research on sensitization, or tuning, of the autonomic nervous system. The process of suggestion is defined as incorporating both an automatic and cognitive component in tuned individuals; the significance of autonomic tuning in cause and cure of psychosomatic illness and in voodoo death is explored.

DISCUSSION OF THE ETIOLOGY of voodoo death has recently been revived in the pages of the American Anthropologist. Lester (1972) endorses a psychological explanation, that of suggestion, while Clune (1973) favors a pharmacological explanation, that of poison; both authors place little credence in physiological processes as causal factors in cases of voodoo death. However, in 1957 Richter, a physiologist, identified voodoo death as a human manifestation of vagus death resultant from overstimulation of the parasympathetic nervous system; his paper supplants the earlier work of Cannon (1942) in which the physiological cause of voodoo death was attributed to hyperreactivity of the sympathetic nervous system. Revival of the question indicates that ethnographers either lack knowledge of autonomic nervous system functioning or disavow the significance of the autonomic nervous system in human behavior.

NEUROPHYSIOLOGICAL EVIDENCE

Although Chapple (1970), an anthropologist, has amply documented the importance of the autonomic nervous system in human behavior, manifested, in his terms, in "emotional-interaction patterns," the broad implications of his work have not been recognized in anthropological approaches to religion and magic. A brief, necessarily simplified overview of central nervous system functioning provides a basis for further discussion.

Fundamental to an understanding of the autonomic nervous system is the property of mutual antagonism in the reciprocal activation of subsystems known as sympathetic and parasympathetic, respectively. As a major system maintaining bodily homeostasis, the autonomic nervous system rapidly responds to intra- and extrasomatic stimuli, activating appropriate behaviors in innervated tissues and in skeletal muscles as well as affecting activity in the cerebral cortex. Under ordinary responses to stimuli autonomic fluctuations are almost imperceptible, but exposure to more intense stimuli, such as cold or an unexpected noise, results in a mild degree of sympathetic response, while parasympathetic response accounts for reaction to the smell of food or stroking the skin, to cite some simple examples.

Submitted for publication February 19, 1974
Accepted for publication June 20, 1974

Up to certain thresholds, which vary slightly from person to person because of individual differences produced both by inheritance and by learning, activation of one system is accompanied by inhibition of the other. Crossing that threshold, however, results in sensitization or "tuning," to use the neurophysiologist's term.

Cannon, a pioneer of modern neurophysiology, who initiated the neurophysiological discussion of voodoo death in 1942, had earlier (1929) explained reactivity in the sympathetic nervous system in terms of preparation for emergency situations. In "fight or flight" contexts some arteries relax while others contract, shunting blood from the viscera to the stiated muscles; blood pressure and heart rate rise accordingly; the pupils dilate; perspiration increases body cooling; the bronchia to the lungs dilate, providing more oxygen; and digestive activity, maintained by the parasympathetic nervous system, is inhibited. Briefly stated, the sensitized sympathetic nervous system can mobilize the individual by arming the muscle structure and at the same time halting or reducing activity in bodily organs not immediately necessary for escape or combat.

Parasympathetic nervous system activity, which inhibits sympathetic reactivity, is characterized by slowed respiration and heart rate, pupillary constriction, reduced blood pressure, and diversion of blood from the straited muscles to the viscera, and usually prevails during sleep, digestion, grooming, and other pleasurable states. More importantly, after high sympathetic discharge parasympathetic compensation inevitably follows.[*]

Richter (1957) explained voodoo death as the result of parasympathetic hyperreactivity, or vagus death, but omitted two important points. First, the mutually antagonistic interplay of sympathetic and parasympathetic function which prevails in ordinary life circumstances is not clearly spelled out for readers, including anthropologists, unacquainted with human neurophysiology. Cannon's emphasis on "fight or flight" in the emotions of fear and anger, although generally known, obscures the more usual functioning of the sympathetic nervous system in an alert, wakeful response to stimuli; moreover, investigation of the sympathetic nervous system has received more attention than that devoted to examination of parasympathetic functioning. Second, although Richter notes that a stress response characterized by accelerated heart rate often precedes the deceleration of heart rate, slowed respiration, and fall of body temperature which ultimately precipitated the demise of the rats in his experiment, he does not explicitly establish that this response is parasympathetic reactivity to an initial condition of intense sympathetic excitation; for readers unacquainted with the reciprocal action of these two subsystems, the role of the parasympathetic nervous system in exhaustion is neither identified nor described.

Lester (1972) has faulted the work of Cannon and Richter as limited and based only on animal research; dismissing both Cannon's and Richter's physiological explanations as possible but undemonstrable, he instead proposes a psychological explanation, that of "death by suggestion." "Suggestion" in this context is a reductive assertion unless the process denoted by this term is subjected to scrutiny and clearly defined. Furthermore, Lester implies that mental activity alone determines psychological states—an overly truncated perspective. Cognitive activity is highly conditioned by one's physiological state. Therefore, cognitive and autonomic processes operant in any given state should be identified.

In the sixteen years intervening between the appearance of Richter's article and the present writing, much painstaking research in neurophysiology has uncovered effects of tuning on the autonomic nervous system. However, most neurophysiologists and psychophysiologists not only lack the cross-cultural orientation which would prompt research on topics of specific interest to anthropologists, but also maintain a laboratory research orientation which effectively precludes investigation of non-Western subjects. Their attitude of skepticism to voodoo death is exemplified by Barber (1961). Recently, however, some interest in certain cultural practices, such as Zen or Yogic meditation, has begun to stimulate psychophysiological research which examines behavior not ordinarily found in Western subjects. Findings derived from animal research and from experimental neuroses in man have been applied to clinical observation of human psychosomatic disorders (Gellhorn and Kiely 1973), thereby challenging Lester's criticism of Cannon and Richter. Significantly, autonomic tuning, which I shall explore below, is fundamental to cause and cure in psychosomatic disorders as well as to the physiological component of meditation practices, and also provides an explanation for the process of suggestion in voodoo death.

CENTRAL NERVOUS SYSTEM TUNING

Gellhorn and his colleagues have devoted lengthy, systematic research to the study of the central nervous system. Connoting "sensitization or facilitation of particular centers" (Gellhorn and Loufbourrow 1963:91), tuning may be accomplished by direct stimulation of either the sympathetic or parasympathetic system, by use of certain drugs which activate or block one or the other system, or by types of mental activity. Each subsystem of the autonomic nervous system also mediates responses of the brain and skeletal muscles, and generally only under special circumstances (in laboratory experiments or in pathogenic conditions), are these somatic responses separable from autonomic function (Lacey 1967). Hence, integration of these subsystems, termed ergotropic and trophotropic, is emphasized. Ergotropic response consists of augmented sympathetic discharges, increased tone of skeletal muscles, and excitation in the cerebral cortex manifested in desynchronized rhythms. The trophotropic pattern is constituted of heightened parasympathetic discharges, relaxed skeletal muscles, and synchronized cortical rhythms (Gellhorn and Kiely 1972).

Three stages of turning are recognized (Gellhorn and Kiely 1973:238). In the first stage response in one system increases while at the same time reactivity in the other system decreases. If augmented reactivity of the sensitized system continues past a certain threshold, as in the case of sustained threating stimuli, not only is inhibition of the nonsensitized system complete, but also stimuli which usually elicit response in the nonsensitized system instead evoke a response in the sensitized system. This second stage is said to be characterized by reversal phenomena. Continued stimuli can lead to a third stage, in which reciprocal relationships fail entirely and simultaneous excitations result. Chronic heightened activation of both nervous sytems is maladaptive, precluding homeostasis and characteristically resulting in experimental as well as clinical neurosis, psychomatic disorders, and psychosis (Gellhorn and Kiely 1973:238-239). However, simultaneous excitation, termed "mixed discharges," also characterizes Zen and Yogic meditation or ecstasy (Gellhorn and Kiely 1972), suggesting that the particular physiological location of neural excitation and the cultural framework explaining the experience of the individual are both important in the etiology of disorders resultant from stage three tuning. This also explains why classification of emotions into those involving only one of the other systems is not a workable solution to the problem of identifying the autonomic component of human behavior. As Gellhorn points out, distinction of pleasant from unpleasant states provides no assistance for analysis of the more intense emotions, such as anxiety, in which both systems are affected (1970:70-71). He suggests striated muscle tone as a better diagnostic for classification, indicating that cognitive factors and muscle tonicity may be mutually reinforcing.

Furthermore, activation of the autonomic nervous system beyond certain thresholds, as in the first stage of tuning, precludes logical reasoning: although the sympathetic nervous system maintains alertness under ordinary circumstances, intense ergotropic excitement results in a restorative, life-conserving trophotropic phase of inactivity or let down and in resting phases; with the exception of rapid eye movement or "paradoxical sleep," activity is relatively low and regular. In the second stage of tuning, activation of the tuned system has exceeded the threshold of analytical judgment—in activation of either system incoming stimuli have little impact beyond further arousal. In the third phase mixed discharges produce mixed cortical response—resting *and* active rhythms are characteristic—and the complex autonomic state of the individual precludes the clear thinking characteristic of information processing in ordinary homeostasis. Hence, a tuned individual is by definition uncritical and therefore ripe for the suggestion that he will die by magical means.

If an individual in stage two tuning perceives that he is hopeless and helpless, as Lester indicates, contrary stimuli only reinforce and intensify his depressed state. The heightened trophotropic response to stress—exhaustion—which inevitably results from reciprocal reactivity in the autonomic nervous system characterizes the frightened person who gives up: the stage is then set for acute trophotropic response—vagus or voodoo death. Althoug mild trophotropic reactivity is characteristically pleasurable, as in a mouthwatering response to one's favorite food, more intense trophotropic activation can result in symptoms which prevent ingestion of nourishment: heartburn, ulcers, nausea, vomiting, and diarrhea. Treated as socially dead, "boned" or "voodooed" persons refuse proffered food and water simply because they at the very least experience the anorexia characteristic of heightened trophotropic activity, and, more likely, their sensitized bodies would not be able to tolerate ingestion of food or fluid. Apathy, fatigue, and anorexia characterize depression, another less acute example of stage two tuning of the trophotropic system (Gellhorn and Kiely 1973:148). Furthermore, individuals already in ill health, whom Barber indicates as those most likely to succumb to the suggestion of death via witchcraft (1961), have already been under stress, and therefore are in a state of lassitude which can be aggravated by witchcraft.

Chapple has demonstrated that one important function of ritual is the establishment of autonomic synchrony (1970:317): likening the process by which synchrony is achieved to that of abreaction, which can be defined as "a process of reviving the memory of a repressed unpleasant experience and expressing in speech and action the emotions related to it, thereby relieving the personality of its influence" (Gellhorn and Loufbourrow 1963:297), Chapple explains the relationship between rites of passage and autonomic asynchrony:

> It seems quite evident, but little studied systematically, that the rites have evolved, in part at least, as structured means through which equilibrium—in all its complex emotional-interaction patterns is reestablished . . . rites of passage in many societies enable individuals to abreact . . . in so doing, they discharge the emotional tensions [of] the sympathetic nervous system" [1970:317].

A similar case can be made for the role of autonomic tuning in curing rituals. Psychosomatic illnesses, from a physiological perspective, are produced by mixed excitations resultant from stage three autonomic tuning engendered by stressful life circumstances. Curing rituals manipulate the central nervous system, in whole or in part, in order to regain autonomic balance, thus alleviating the dysfunctional symptoms produced by mixed activity.

Diagnosticians who prescribe specific rituals and substances for the ill must have a good working knowledge of potential fluctuations in autonomic functioning. Hence, in the case of the shaman or the medicine society member, apprenticeship is served through personal illness, resulting in an augmented ability to recognize the possible etiology of disorders.

Indeed, ritual therapies of Iroquois medicine societies reflect considerable insight into the dynamics of autonomic balance. Ministrations of the False Face Society, for example, are appropriate for disorders or injuries involving the flow of blood, dysplasias, and dreams or hallucinations of the False Faces themselves. In traditional Iroquois belief such events require False Face curing rituals, and, once treated, the individual becomes a member of that medicine society and participates in the treatment of others.

An informed observer can discover trophotropic activation in weeping, dizziness, profuse salivation, nausea, frequent elimination of wastes, and pupillary constriction; similarly, ergotropic activation is exhibited in profuse sweating, constipation, muscular rigidity, and pupillary dilation; mixed discharges are evinced by the simultaneous presence of symptoms characteristic of both systems. Having discerned the nature and degree of tuning involved in a particular disorder, appropriate therapeutic measures can be taken. More importantly, the means to alleviate disorders should also provide the knowledge to cause illness. In other words, practical knowledge of emotion and autonomic functioning should permit manipulations which can result in dysfunction, if not death. Thus, knowledge necessary for cure also provides information which permits manipulation of the autonomic system in order to diminish vital functioning below a critical threshold. Rather than the vague notion of suggestion or sly poisoning, the physiological conditions of autonomic tuning adequately explain voodoo death.

CONCLUSION

Suggestion is indeed at work in voodoo death cases, but suggestion must be understood as one aspect of the complex emotional-interactional forms characteristic of human biology. In this view, the hitherto mysterious, arcane nature of voodoo death is supplanted by a physiologically-based interpretation. Suggestion in this context is accomplished by the practitioner's manipulation of the autonomic nervous system through the victim's cognitive apprehension of the meaning of witchcraft. The extreme fright experienced by the individual who has been thus singled out can be as fatal as a dose of poison.

Empirical testing of this explanation should neither be difficult nor require sophisticated laboratory apparatus. Pupillary constriction, easily observable and indicative of parasympathetic activation, provides one ready diagnostic for fieldworkers; the amount of saliva, of perspiration, degree of muscle tonicity and skin pallor in an individual are also discernable without complicated instruments. Fieldworkers contemplating research in societies where voodoo deaths are possible occurrences should familiarize themselves with the visible effects of autonomic tuning and carefully note observable physiological responses in such cases.

NOTE

[1] Research on human neurophysiology, a portion of which is reported in this paper, was supported by the Faculty Research Fellowship Fund of Western Michigan University and permitted observation and consultation at the Langley Porter Neuro-psychiatric Institute, San Francisco, California in 1973. Fieldwork on Iroquois Medicine Societies was assisted by the Phillips Fund of the American Philosophical Society in 1966.

REFERENCES CITED

Barber, Theodore X.
1961 Death by Suggestion: A Critical Note. Psychosomatic Medicine 23:153-155.
Cannon, Walter B.
1929 Bodily Changes in Pain, Hunger, Fear and Rage: An Account of Researches into the Function of Emotional Excitement. New York: Appleton-Century.
1942 Voodoo Death. American Anthropologist 44:169-181.
Chapple, Eliot D.
1970 Culture and Biological Man: Explorations in Behavioral Anthropology. New York: Holt, Rinehart and Winston.
Clune, Francis J.
1973 A Comment on Voodoo Deaths. American Anthropologist 75:312.
Gellhorn, Ernst
1970 The Emotions and the Ergotropic and Trophotropic Systems. Psycholische Forschung 34:48-94.

Gellhorn, Ernst, and William F. Kiely

1972 Mystical States of Consciousness: Neurophysiological and Clinical Aspects. Journal of Nervous and Mental Disease 154:399-405.

1973 Autonomic Nervous System in Psychiatric Disorder. *In* Biological Psychiatry. Joseph Mendels, Ed. New York: John Wiley and Sons. pp. 235-261.

Gellhorn, Ernst, and G. N. Loofbourrow

1963 Emotions and Emotional Disorders: A Neurophysiological Study. New York: Harper and Row.

Lacey, J. L.

1967 Somatic Response Patterning and Stress: Some Revision of Activation Theory. *In* Psychological Stress. M. H. Appley and R. Trumbell, Eds. New York: Appleton-Century Crofts.

Lester, David

1972 Voodoo Death: Some New Thoughts on an Old Phenomenon. American Anthropologist 74:386-390.

Richter, C. P.

1957 On the Phenomenon of Sudden Death in Animals and Man. Psychosomatic Medicine 19:191-198.